

IN THE CLAIMS:

Please amend the claims as follows:

27. (Amended) An image display device having direct and projection viewing modes of operation, comprising:

a transportable housing having first and second light transmission apertures formed therein and aligned with each other;

a display panel assembly including

light producing means installed in said transportable housing, for producing light in the direction of a projection axis during said direct viewing mode;

a thin lens panel mounted in said transportable housing along said projection axis;

a light guiding panel having first and second light guiding surfaces between which said produced light can be totally internally reflected;

~~a rear housing panel for covering a substantial portion of said rear light transmission aperture during said direct viewing mode, and having an interior surface;~~

~~a light reflective surface disposed on said interior surface of said rear housing panel;~~

a light diffusing structure operably associated with said light guiding panel, for scattering light within said light guiding panel during said direct viewing mode;

a programmable spatial light mask disposed adjacent said thin lens panel, having a display surface and means for spatially modulating the intensity of light transmitted through said thin lens panel during said projection viewing mode;

a rear housing panel for covering a substantial portion of said rear light transmission aperture during said direct viewing mode, and having an interior surface;

a light reflective surface disposed on said interior surface of said rear housing panel;

a portable light projection device including

a first housing portion containing a light producing device for producing visible light, and a light focusing means for focusing and directing said produced visible light through said display panel assembly for optical processing and conversion into a light image on the display surface of said programmable spatial light mask;

a second housing portion having a light image projecting lens for projecting onto a viewing surface, the image displayed on the display surface of said programmable spatial light mask; and

a reconfigurable structure operably connecting said first and second housing portions, said reconfigurable structure being positionable about said display panel housing when said portable light projecting device is used in conjunction with said image display device, and permitting said first and second housing portions to be brought together into a compact arrangement when said portable light projecting device is being stored or transported;

wherein during said direct viewing mode, light is produced from said light producing means and is reflected within said light guiding panel and scattered by said light diffusing structure, and a portion of said scattered light is transmitted through said first light guiding surface and said programmable spatial light mask, whereupon said transmitted light is spatial-intensity modulated so as to form a light image on the display surface of said programmable spatial light mask; and

wherein during said projection viewing mode, light is produced from the light producing device~~an external source~~ and is transmitted through said thin lens panel and said programmable spatial light mask, whereupon said transmitted light is focused and spatial-intensity modulated so as to form a light image on a viewing surface disposed at a distance from said programmable spatial light mask.

28. (Original) The image display device of claim 27, which further comprises means for displaying on said display surface, a composite pixel pattern representative of a spatially multiplexed image composed of first and second spatially modulated perspective images of a 3-D object, said first spatially modulated perspective image consisting of a first pixel pattern representative of a first perspective image of said 3-D object spatially modulated according to a first spatial modulation pattern, said second spatially modulated perspective image consisting of a second pixel pattern representative of a second perspective image of said 3-D object spatially modulated according to a second spatial modulation pattern, said second spatial modulation pattern being a logical complement of said first spatial modulation pattern, and

a micropolarization panel comprising an optically transparent sheet mounted onto said display surface of said spatial light mask, said optically transparent sheet having first and second optically transparent patterns permanently formed in said first optically transparent sheet, said first optically transparent pattern spatially corresponding to and being spatially aligned with said first pixel pattern so as to impart a first polarization state  $P_1$  to said first pixel pattern, and said second optically transparent pattern spatially corresponding to and being spatially aligned with said second pixel pattern so as to impart a second polarization state  $P_2$  to said second pixel pattern, said second polarization state  $P_2$  being different than said first polarization state  $P_1$ .

29. (Original) The image display device of claim 28 in combination with electrically-passive polarization glasses.

30. (Original) The image display device of claim 27, wherein said light guiding panel has first and second light conducting edges, and wherein said light producing means comprises first and second fluorescent tubes disposed along said first and second light conducting edges, respectively, said first and second fluorescent tubes producing and transmitting light through said first and second light conducting edges during said direct viewing mode.

31. (Original) The image display device of claim 30, which further comprises first and second light focusing elements disposed in proximity with said first and second fluorescent tubes, respectively, for focusing light produced from said first and second

fluorescent tubes and directing said focused light across said first and second light conducting edges and into said light guiding panel.

Please cancel claim 32.

33. (Amended) The image display device of claim ~~32~~27, which further comprises a light polarizing filter disposed in said first housing portion, for imparting a selected polarization state to visible light transmitted through said display panel assembly.

34. (Original) The image display device of claim 27, which further comprises an optically transparent touch-screen panel disposed adjacent said programmable spatial light mask.

35. (Amended) A portable computer-based system having direct and projection viewing modes of operation, comprising:

(A) a transportable housing of compact construction and having first and second light transmission apertures formed therein and aligned with each other,

(B) data storage means, disposed in said transportable housing, for storing data representative of one or more light images to be displayed;

(C) a backlighting construction disposed in said transportable housing, having direct and projection viewing modes of operation, and including

- (1) light producing means installed in said transportable housing, for producing light in the direction of a projection axis during said direct viewing mode,
  - (2) a thin lens panel mounted in said transportable housing along said projection axis,
  - (3) a light guiding panel having first and second end portions, and first and second light guiding surfaces between which said produced light can be totally internally reflected,
  - (4) a rear housing panel having a spatial extent sufficient for covering a substantial portion of said rear light transmission aperture during said direct viewing mode,
  - (5) a light reflective surface disposed adjacent the interior surface of said rear housing panel, and
  - (6) a light diffusing structure operably associated with said light guiding panel, for scattering light within said light guiding panel during said direct viewing mode;
- (D) a programmable spatial light mask, disposed adjacent said thin lens panel, having a display surface and means for spatially modulating the intensity of light transmitted through said programmable spatial light mask;
- (E) a portable light projection device including

a first housing portion containing a light producing means for producing visible light, and a light focusing means for focusing and directing said produced visible light on the display surface of said programmable spatial light mask;

a second housing portion having a light image projecting lens for projecting onto a viewing surface, the image displayed on the display surface of said programmable spatial light mask; and

a reconfigurable structure operably connecting said first and second housing portions, said reconfigurable structure being positionable about said display panel housing when said portable light projecting device is used in conjunction with said image display device, and permitting said first and second housing portions to be brought together into a compact arrangement when said portable light projecting device is being stored or transported;

wherein during said direct viewing mode, light is produced by said light producing means and is reflected within said light guiding panel and scattered by said light diffusing structure, and a portion of said scattered light is transmitted through said first light guiding surface and said programmable spatial light mask, whereupon said transmitted light is spatial-intensity modulated so as to form a light pattern on the display surface of said programmable spatial light mask, and

wherein during said projection viewing mode, light is produced from ~~an external source~~the light producing means and is reflected off said light reflective surface and transmitted through said thin lens panel and said programmable spatial light mask, whereupon said transmitted light is focused and spatial-intensity modulated so as to form

a light image on a viewing surface at a distance from said programmable spatial light mask.

36. (Original) The portable computer-based system of claim 35, wherein said light guiding panel further comprises a first light conducting edge through which light produced from said light producing means can be transmitted into said light guiding panel for total internal reflection between said first and second light guiding surfaces.

37. (Original) The portable computer-based system of claim 35, which further comprises:

means for displaying on said display surface, a composite pixel pattern representative of a spatially multiplexed image composed of first and second spatially modulated perspective images of a 3-D object, said first spatially modulated perspective image consisting of a first pixel pattern representative of a first perspective image of said 3-D object spatially modulated according to a first spatial modulation pattern, said second spatially modulated perspective image consisting of a second pixel pattern representative of a second perspective image of said 3-D object spatially modulated according to a second spatial modulation pattern, said second spatial modulation pattern being a logical complement of said first spatial modulation pattern; and

a micropolarization panel comprising an optically transparent sheet mounted onto said display surface of said programmable spatial light mask, said optically transparent sheet having first and second optically transparent patterns permanently formed in said first optically transparent sheet, said first optically transparent pattern spatially



corresponding to and being spatially aligned with said first pixel pattern so as to impart a first polarization state  $P_1$  to said first pixel pattern, and said second optically transparent pattern spatially corresponding to and being spatially aligned with said second pixel pattern so as to impart a second polarization state  $P_2$  to said second pixel pattern, said second polarization state  $P_2$  being different than said first polarization state  $P_1$ .

38. (Original) The portable computer-based system of claim 35, which further comprises a display control means for controlling the spatial intensity of light emerging from said programmable spatial light mask, and

wherein said programmable spatial light mask comprises a liquid crystal display panel comprising an array of electrically addressable pixels, each said pixel having a light transmittance that is controllable by said display control means.

39. (Amended) The portable computer-based system of claim 35, wherein said light guiding panel is made from an optically transparent plastic.

40. (Original) The portable computer-based system of claim 35, wherein said light guiding panel comprises first and second light conducting edges, and wherein said light producing means comprises first and second fluorescent tubes disposed along said first and second light conducting edges, respectively, said first and second fluorescent tubes producing and transmitting light through said first and second light conducting edges during said direct viewing mode.

41. (Original) The portable computer-based system of claim 35, wherein said backlighting construction further comprises

first and second light focusing elements disposed in proximity with said first and second fluorescent tubes, respectively, for focusing light produced from said first and second fluorescent tubes and directing said focused light across said first and second light conducting edges and into said light guiding panel.

42. (Amended) An image display device having direct and projection viewing modes of operation, comprising:

a transportable housing having first and second light transmission apertures formed therein and aligned with each other;

light producing means installed in said transportable housing, for producing light along a projection axis during said direct viewing mode;

a thin light focusing element mounted in said transportable housing along said projection axis;

a rear housing panel having an interior surface and a spatial extent sufficient for covering a substantial portion of said rear light transmission aperture during said direct viewing mode;

a light guiding panel attached to said rear housing portion, and having first and second light guiding surfaces between which said produced light can be totally internally reflected; a light reflective surface disposed between said light guiding panel and the interior surface of said rear housing panel;

a light diffusing structure operably associated with said light guiding panel, for scattering light within said light guiding panel during said direct viewing mode; and

a programmable spatial light mask disposed adjacent said thin lens panel, and having a display surface and means for spatially modulating the intensity of light transmitted through said programmable spatial light mask during said projection viewing mode;

a light projection device including

a first housing portion containing a light producing device for producing visible light, and a light focusing means for focusing and directing said produced visible light on the display surface of said programmable spatial light mask;

a second housing portion having a light image projecting lens for projecting onto a viewing surface, the image displayed on the display surface of said programmable spatial light mask; and

a reconfigurable structure operably connecting said first and second housing portions, said reconfigurable structure being positionable about said display panel housing when said light projecting device is used in conjunction with said image display device, and permitting said first and second housing portions to be brought together into a compact arrangement when said portable light projecting device is being stored or transported;

wherein during said direct viewing mode, light is produced from said light producing means and is reflected within said light guiding panel and scattered by said light diffusing structure, and a portion of said scattered light is transmitted through said

first light guiding surface and said programmable spatial light mask, whereupon said transmitted light is spatial-intensity modulated so as to form a light image on the display surface of said programmable spatial light mask; and

wherein during said projection viewing mode, light is produced from ~~an external source~~ the light projection device and is transmitted through said thin light focusing element and said programmable spatial light mask, whereupon said transmitted light is focused and spatial-intensity modulated so as to form a light image on a viewing surface disposed at a distance from said programmable spatial light mask.

43. (Original) The image display device of claim 42, which further comprises means for hingedly connecting said light guiding panel or said rear housing panel to said transportable housing.

44. (Original) The image display device of claim 42, wherein said light guiding panel has first and second light conducting edges, and wherein said light producing means comprises first and second fluorescent tubes disposed along said first and second light conducting edges, respectively, said first and second fluorescent tubes producing and transmitting light through said first and second light conducting edges during said direct viewing mode.

45. (Original) The image display device of claim 44, which further comprises first and second light focusing elements disposed in proximity with said first and second fluorescent tubes, respectively, for focusing light produced from said first and second

fluorescent tubes and directing said focused light across said first and second light conducting edges and into said light guiding panel.

Please cancel claim 47.

48. (Amended) A portable image display system comprising:

(a) a portable computer based system including a transportable housing having first and second light transmission apertures formed therein and aligned with each other and a display panel assembly substantially within the aligned apertures, the display panel assembly having

a programmable spatial light mask with a display surface, and

a thin lens panel disposed adjacent said display surface and having a focal point;

and

(b) a portable light projection device positionable about said focal point, said portable light projection system including

a hand-supportable housing of compact construction;

a light producing means disposed in said hand-supportable housing, for producing visible light;

a light focusing means disposed in said housing, for focusing and directing said produced visible light towards said programmable spatial light mask for optical processing and conversion into a light image on the display surface of said programmable spatial light mask; and

an image projecting lens disposed in said housing, for projecting onto a viewing surface, the light image displayed on the display surface of said programmable spatial light mask.

49. (Amended) A portable computer-based system having direct and projection viewing modes of operation, comprising:

a transportable housing of compact construction and having first and second light transmission apertures formed therein and aligned with each other,

data storage means, disposed in said transportable housing, for storing data representative of one or more light images to be displayed;

a backlighting construction disposed in said transportable housing, having direct and projection viewing modes of operation, and including

a rear housing panel having an interior surface and a spatial extent sufficient for covering a substantial portion of said rear light transmission aperture during said direct viewing mode,

light producing panel installed in said transportable housing, for producing light along a projection axis during said direct viewing mode,

a thin lens panel mounted in said transportable housing, and

a programmable spatial light mask, disposed adjacent said thin lens panel, for spatially modulating the intensity of light transmitted through said programmable spatial light mask;

a light projection device including

a first housing portion containing a light producing device for producing visible light, and a light focusing means for focusing and directing said produced visible light on the display surface of said programmable spatial light mask;

a second housing portion having a light image projecting lens for projecting onto a viewing surface, the image displayed on the display surface of said programmable spatial light mask; and

a reconfigurable structure operably connecting said first and second housing portions, said reconfigurable structure being positionable about said display panel housing when said light projecting device is used in conjunction with said image display device, and permitting said first and second housing portions to be brought together into a compact arrangement when said portable light projecting device is being stored or transported;

wherein during said direct viewing mode, light is produced from said light producing panel and is transmitted through said thin lens panel and said programmable spatial light mask, whereupon said transmitted light is focused and spatial-intensity modulated so as to form a light image on the display surface of said programmable spatial light mask, and

wherein during said projection viewing mode, light is produced from ~~an external source~~ the light projection device and is transmitted through said thin lens panel and said programmable spatial light mask, whereupon said transmitted light is focused and spatial-intensity modulated so as to form a light image on a viewing surface disposed at a distance from said programmable spatial light mask.

50. (Original) The portable computer-based system of claim 49, which further comprises

a display control means for controlling the spatial intensity of light emerging from said programmable spatial light mask, and

wherein said programmable spatial light mask comprises a liquid crystal display panel comprising an array of electrically addressable pixels, each said pixel having a light transmittance that is controllable by said display control means.

51. (Original) The portable computer-based system of claim 49 wherein said light producing panel comprises an optically transparent plastic panel.

52. (Amended) An image display device having direct and projection viewing modes of operation, comprising:

a transportable housing having first and second light transmission apertures formed therein and aligned with each other,

a rear housing panel having an interior surface and a spatial extent sufficient for covering a substantial portion of said rear light transmission aperture during said direct viewing mode;

a light producing structure attached to the interior surface of said rear housing portion, for producing light in the direction of a projection axis during said direct viewing mode;

a thin light focusing element mounted in said transportable housing along said projection axis;



a programmable spatial light mask, disposed adjacent said thin lens panel, and having a display surface and means for spatially modulating the intensity of light transmitted through said programmable spatial light mask during said projection viewing mode;

a light projection device including

a first housing portion containing a light producing device for producing visible light, and a light focusing means for focusing and directing said produced visible light on the display surface of said programmable spatial light mask;

a second housing portion having a light image projecting lens for projecting onto a viewing surface, the image displayed on the display surface of said programmable spatial light mask; and

a reconfigurable structure operably connecting said first and second housing portions, said reconfigurable structure being positionable about said display panel housing when said light projecting device is used in conjunction with said image display device, and permitting said first and second housing portions to be brought together into a compact arrangement when said portable light projecting device is being stored or transported;

wherein during said direct viewing mode, light is produced from said light producing structure and is transmitted through said thin light focusing element and said programmable spatial light mask, whereupon said transmitted light is focused and spatial intensity modulated so as to form a light image on the display surface of said programmable spatial light mask; and

wherein during said projection viewing mode, light is produced from an external source ~~the light projection device~~ and is transmitted through said thin light focusing element and said programmable spatial light mask, whereupon said transmitted is focused and spatial intensity modulated so as to form a light image on a viewing surface disposed at a distance from said programmable spatial light mask.

53. (Original) The image display device of claim 52, which further comprises means for hingedly connecting the assembly of said light producing structure and said rear housing panel to said transportable housing.

54. (Original) The image display device of claim 52, wherein said thin light focusing element is a thin light focusing panel and wherein said light ~~reducing~~ structure is a thin light producing panel.

55. (Amended) A portable image display system comprising:

(a) a portable image display device including

(1) a transportable housing having first and second light transmission apertures formed therein and aligned with each other, and

(2) a display panel ~~assembly~~ assembly substantially within the aligned apertures having

a programmable spatial light mask having a display surface and means for modulating the spatial intensity of light transmitted therethrough, and

a thin lens panel disposed closely adjacent said display surface and  
having a focal point; and

(b) a portable light projection device positionable at about the focal point of  
said thin lens panel, said portable light projection system including

hand-supportable housing;

light producing means disposed in said hand-supportable housing, for  
producing visible light;

a light focusing means disposed in said hand-supportable housing, for  
focusing and directing said produced visible light towards said programmable  
spatial light mask for optical processing and conversion into a light image on the  
display surface of said programmable spatial light mask; and

an image projecting lens disposed in said hand-supportable housing, for  
projecting onto a viewing surface, the light image displayed on the display surface  
of said programmable spatial light mask.